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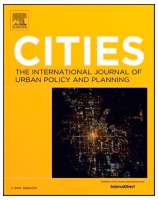

The paradox of the unhappy, growing city: Reconciling evidence

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ABSTRACT

This paper attempts to explain why some large cities in developed countries score low on indices of happiness/life satisfaction, while at the same time experiencing population growth. Using survey and register data to study Norway's biggest city, Oslo, we show that different population segments are behind these seemingly contradictory city attributes. A minority of highly mobile citizens are satisfied with life in Oslo and exhibit positive net migration to the city. A majority of less mobile citizens are dissatisfied and tend to move out of Oslo, but these flows are too small to determine the overall migration pattern.

1. Introduction

A voluminous research literature uses survey data on subjective well-being to investigate whether cities are good places to live (Berry & Okulicz-Kozaryn, 2011; Easterlin et al., 2011; Glaeser et al., 2016; Okulicz-Kozaryn, 2017; Okulicz-Kozaryn & Mazelis, 2018; Requena, 2016; Shucksmith et al., 2009; Sørensen, 2014; Winters & Li, 2017). Recently, Philip S Morrison and co-authors have drawn attention to the so-called 'urban paradox': in many large cities, average subjective well-being is low compared to the rest of the country, despite urban advantages in production and consumption that benefit residents (Burger et al., 2020; Morrison, 2020; Morrison & Weckroth, 2018). The paradox is mainly observed in developed countries, as subjective well-being tends to be higher in large cities in developing countries (Wang & Wang, 2016). Morrison (2020) points out that the urban paradox has no widely accepted explanation and suggests that it may be attributable to heterogeneity of city residents: appraisal of city-living varies with education and income, where high (low) education and income translates into high (low) subjective well-being in urban environments. The negative appraisal of the low education/income segments matters more for average subjective well-being than the positive appraisal of high education/income segments.

This paper investigates a particular aspect of the urban paradox, the fact that inhabitants often continue to move to cities that display low average subjective well-being. Cities with lower subjective well-being than the rest of the country or other major cities include Athens, Auckland, Berlin, Brussels, Bucharest, Lisbon, Prague, Toronto, and Vienna (Lenzi & Perucca, 2016; Lu et al., 2016; Morrison, 2011; Piper, 2015). When we compare population size before and after the administration of the surveys used by the scholars to study subjective well-being, we find that in all these cities population increased as a share of country population, whereas absolute resident population increased in all cities but Athens and Bucharest (World Population Review, 2020).

This paper presents a possible explanation of this paradox of 'growing and unhappy cities', that is, cities where subjective well-being is low, but with a growing share of the country's population. We argue that a city may be growing and unhappy at the same time due to differences between population segments in migration propensities and location preferences. Net migration is typically determined by the most mobile population groups. If they are satisfied with life in a city, the city will grow even though less mobile groups are dissatisfied and average happiness in the city is low.

Using several waves of a Norwegian national survey and register data about relocations between Norwegian regions, we study heterogeneity between population segments in life satisfaction and migration behavior, attempting to explain why the population of the capital and largest city, Oslo, is rapidly growing despite average life satisfaction not being higher than in the rest of the country.

In the next section, we discuss alternative explanations for the paradox and outline our hypothesis. The following section presents data sources, construction of variables and empirical specifications, then follows empirical analysis, discussion of results and conclusion.

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2. Theoretical framework

2.1. Evidence of growing and unhappy cities

Based on four waves of the European Social Survey (2002–2008), Piper (2015) finds that in about half of the 15 countries considered, people are less happy in the capital, and in most of the remaining countries there are no statistically significant differences between the capital and the rest of the country. For instance, in Belgium, the average response to the question about happiness is 7.7 on a scale from 0 to 10. Controlling for socio-economic covariates, happiness in Brussels is 0.31 points lower and the difference is highly significant ($p < 0.01$). In spite of this, from 2000 to 2010, the population of Brussels increased by 8.1% and as percentage of country population from 17.3 to 17.6% (World Population Review, 2020). Similar results hold for Vienna, Berlin, Prague and Lisbon. In these cities, Piper (2015) finds that people were significantly less happy than in the rest of the country whereas city population increased, both in absolute and relative terms (World Population Review, 2020).

In Athens, people were less happy than in the rest of Greece (Piper, 2015). The population in the city decreased but increased as share of country population. Lenzi and Perucca (2016) arrive at a similar result for Bucharest. Using Eurobarometer waves 1996–2011 for Romania, they find a significant negative effect on life satisfaction of living in Bucharest. In this period, there was considerable outmigration from the country, whereas the population of Bucharest remained close to constant, such that the population share of the capital increased.

Lu et al. (2016) use several waves of two national Canadian surveys covering the period 2009–2013. They find that the largest city, Toronto, scores among the bottom two in terms of life satisfaction among Canada's 33 metropolitan areas, and Toronto's score is significantly lower than the country average. In the same period, the population growth of the city was substantial, also as a share of country population. Using the 2004 Quality of Life Survey, Morrison (2011) compares 12 cities in New Zealand and concludes that happiness is lowest in the largest city, Auckland. Despite this, from 2000 to 2010 Auckland's population increased by about 20%, whereas the population increased only by about 10% in the rest of the country.

2.2. Traditional explanations

Glaeser et al. (2016) list two possible explanations why people move to areas with low scores on happiness/life satisfaction. First, the phenomenon may be explained by geographical heterogeneity in response scale usage. Geographical variation in response scale usage may be caused by psychological traits, as scholars have found that reported subjective well-being is correlated with psychological traits that vary geographically (DeNeve & Cooper, 1998; Diener et al., 1999; Rentflow et al., 2008). Residents in certain areas may report low life satisfaction because they use a lower scale than the rest of the country. Thus, these residents are not really less satisfied with life in their place of residence but are less prone to provide positive evaluations. Glaeser et al. (2016) provide evidence on this hypothesis by studying movers that report subjective well-being in two different places. If a person's response scale usage is not affected by the relocation, comparisons of the same individuals' responses will eliminate heterogeneity as an explanation of geographical differences in subjective well-being. Using this method, Glaeser et al. (2016) conclude that there are significant geographical differences in subjective well-being, which are not attributable to heterogeneity in response scale usage.

Carlsen and Leknes (2021a) arrive at the same conclusion. The authors utilize a survey question on satisfaction with the climate in the respondents' resident municipalities and compare responses with an objective measure of the climate in the municipalities based on meteorological data. The discrepancy between a respondent's subjective assessment and the objective measure is used as proxy for heterogeneity in the propensity of the respondent to provide positive assessments. There are marked differences in response scale usage between respondents, confirmed by a strong and highly significant relation between the proxy variable and reported satisfaction with different domains of life. The proxy is used to correct assessments of place satisfaction (the survey does not include questions on life satisfaction) for heterogeneity in response scale usage. As in the study by Glaeser et al. (2016), the authors find that geographical differences in satisfaction remain after correction, which indicates that observed spatial variation in satisfaction is not unduly affected by heterogeneous response scale usage.

Another explanation proposed by Glaeser et al. (2016) is that people may choose to move to or remain in cities with low happiness/life satisfaction when the choice of location represents a trade-off between subjective well-being and other objectives, for instance career prospects and opportunities for children. Households may thus choose to locate in a big city where they are unhappy if they are sufficiently compensated in some domains of life.[1]

To our knowledge, Lucas (2014) is the only study to investigate the relationship between migration flows and geographical variations in subjective well-being. The author uses assessments of life satisfaction by over 2 million respondents to estimate average life satisfaction for American counties. The findings show a positive cross-county relationship between life satisfaction and population growth/net migration. Thus, the results of Lucas (2014) raise doubt on whether population flows go towards places with low life satisfaction/happiness.

2.3. An alternative explanation of the paradox

We propose a new explanation for the paradox of the growing and unhappy city. We suggest that the paradox can be explained by the existence of sociodemographic groups that vary along two dimensions, satisfaction with city life and mobility.

Our starting point is the argument by Morrison (2020) that low average happiness/life satisfaction in large cities is due to differences between education groups. Persons with high education can afford to live in high-quality neighborhoods and close to work, whereas persons with low education are forced to conduct longer commutes, reducing the quality of social and family life. Over time, the wage gap between education groups has increased in large cities (Autor, 2019), reinforcing within-city inequalities in living standards. In addition to enjoying higher income and better residential environment, persons with higher education have in general stronger preferences for, and thus receive higher utility from, the variety of cultural amenities, goods and services offered by large cities (Adamson et al., 2004; Brueckner et al., 1999; Florida, 2017; Lee, 2010).

A person's evaluation of big city life is likely to be affected by age and family situation, in addition to education level and income. For younger persons, large cities offer educational services, career prospects, a rich nightlife, and better opportunities for finding a partner (Compton & Pollack, 2007; Costa & Kahn, 2000; Feijten et al., 2008). These urban traits are usually not equally highly valued by older persons, for whom job prospects are less important, and who tend to prefer safety, a slow-paced life, the absence of noise and pollution, a comfortable climate and living close to nature, which are amenities usually found in smaller cities, towns and rural areas (Chen & Rosenthal, 2008; Clark, 2003; Dorfmann & Mandich, 2016; Fokkema et al., 1996; Glaeser, 2020; Jauhiainen, 2009; Stockdale et al., 2013; Stockdale & Catney, 2014; Walters, 2002).

Families have larger place requirements than singles. This increases

[1] Lenzi and Perucca (2018) point out that there are both rural and urban communities within big metropolitan areas and find for a set of European countries that average life satisfaction in these areas is low mainly in the urban communities.

the importance of moderate housing prices for residential choices, raising the attractiveness of environments outside the city for families (Karsten, 2020). Pollution and crime, typical large city challenges, point in the same direction (Barlindhaug et al., 2019; Laoire & Stockdale, 2016). Children have heightened vulnerability to diseases from air pollution compared to adults and lose more disability-adjusted life years (DALYS) from these diseases (Forouzanfar et al., 2016; Landrigan et al., 2018). Damm and Dustmann (2014) and Chyn (2018) find that children growing up in high-crime areas are more prone to committing criminal acts as adults. Spending childhood in polluted residential environments has also been found to increase the likelihood of criminal behavior in later life (Aizer & Currie, 2019).

Overall, there are convincing arguments why young, single persons with high education and income are especially attracted to the positive sides of big city life, whereas older persons, families and people with low education and income are more concerned with the negative traits of large cities. Consequently, we expect that the flows of people into large cities are dominated by the former sociodemographic groups (young, single, high education/income), whereas the latter groups (older persons, families, low education/income) are better represented in migration flows out of large cities. The existing literature on urban-rural migration is consistent with this hypothesis. Age decreases and education level increases the probability of moving from rural areas and to cities, singles and separated are more likely than couples to move to cities, and families with children are less likely to move to cities and more likely to move out of cities than families without children (Feijten et al., 2008; Glendinning et al., 2003; Laoire & Stockdale, 2016; Stockdale & Catney, 2014).

The heterogeneity across sociodemographic groups in the evaluation of positive and negative traits of large cities is mirrored in the groups' mobility – the propensity to relocate (Carlsen & Leknes, 2021b; Greenwood, 1997; Machin et al., 2012). The sociodemographic groups that are particularly attracted to large cities are in general more mobile than the groups for whom large cities are relatively less attractive.

Using US data for the period 1981 to 2010, Molloy et al. (2011) estimate one-year probabilities of migrating between states for various sociodemographic groups. The probability is 4.2% for persons aged 18–24 years and declines with age to 0.9% for persons 65 years or older. The propensity to migrate increases in education level. Persons with college degree or higher display a probability of moving over the state border almost three times greater than persons without a high school diploma. Children in the household reduce and high income increases the propensity to migrate.

Carlsen & Leknes (2021b) arrive at similar conclusions based on migration across Norwegian regions. Young and educated persons without children are more mobile than older persons with children and without higher education. For most age groups, married couples are less mobile than single persons.

When sociodemographic groups that are attracted by big city life, are more mobile than groups which prefer other locations, there is no obvious correlation between average happiness/life satisfaction and net migration to the city. Average happiness/life-satisfaction depends on the composition of citizens living within the city. Low score on happiness/life satisfaction in a city either reflects that there are more citizens with a negative appraisal of big city life than citizens with a positive appraisal, or that the former group holds stronger opinions, that is, opinions that deviate more from the national average evaluation.

Net migration is the difference between in-migration and out-migration. In-migration depends on the number of potential movers living outside the city and their propensities to relocate. Out-migration is a function of the number of dissatisfied citizens within the city and their relocation propensities. Even when a large share of citizens in a city is unhappy, in-migration will exceed out-migration if potential out-movers living in the city are relatively immobile and potential in-movers outside the city are many and/or mobile.

To sum up, we hypothesize that large cities with low average happiness/life satisfaction often experience population growth because migration flows over city borders are dominated by mobile population segments that appreciate big city life, whereas average happiness/life satisfaction is determined by a majority of less satisfied and less mobile citizens.

3. Data and methodology

3.1. The setting: Norway and the city municipality of Oslo

Norway is an elongated country ranking among the top ten in Europe with respect to geographical size but with a population of only about 5.4 million, resulting in low population density. The country has no cities comparable in size to the largest metropolises. The capital and by far largest city, Oslo, counts 697,000 inhabitants. Overall, population in Norwegian municipalities is small with a median size just above 5000. Six cities have between 300,000 and 100,00 inhabitants and 12 cities between 50,000 and 100,000 inhabitants. 16 and 53% of the population reside in municipalities with below 10,000 and 50,000 inhabitants, respectively (Statistics Norway, 2021).

Oslo has seen substantial population increases over the last decades. From 2002 to 2021, the population swelled by 36%, and the capital's share of the country's population increased from 11.3 to 12.9% (Statistics Norway, 2021). The city displays many of the standard positive and negative attributes of large cities. Oslo has the highest average income and share of college-educated persons in the country, offers a variety of cultural amenities and scores high on international lists of places to visit. On the other hand, the city has the most severe traffic congestion problems and air pollution in the country, a high crime rate, and a high share of low-income and immigrant families (Carlsen & Leknes, 2021b).

To test our explanation for the urban paradox, we conduct a quantitative analysis where Oslo is compared to the rest of the country with respect to migration patterns and life satisfaction.

3.2. Overview of the analysis

Fig. 1 presents the steps of our analysis. We first use register-based migration data for the Norwegian population aged 20–89 to analyze how the decision to relocate between regions depends on six sociodemographic characteristics: age, sex, marital status, children in the household, education level and immigrant status. Based on the results, predicted relocation probabilities, denoted mobility scores, are computed for each individual. The population is then sorted according to mobility scores and allocated to four mobility quartiles, where persons in the first mobility quartile have the lowest mobility scores and those in the fourth quartile have the highest mobility scores. The migration data are then used to compute migration flows to and from Oslo for each of the mobility quartiles, and the size and sociodemographic composition of in- and out-migration are compared across quartiles.

Next, we use survey data to examine the relationship between the propensity to relocate and life satisfaction in Oslo relative to life satisfaction in the rest of the country. The survey data set contains the sociodemographic variables used to predict interregional migration. This allows us to use the results of the migration analysis to compute mobility scores for each survey respondent and allocate the respondents to the respective mobility quartiles, using the same mobility score thresholds as between quartiles in the migration data set. For each mobility group, life satisfaction in Oslo is compared with life satisfaction in the rest of the country.

The explanation for the urban paradox outlined above implies that the more mobile parts of the population will be overrepresented in in-migration to Oslo and exhibit high levels of life satisfaction in the capital, whereas the less mobile parts of the population will be overrepresented in out-migration and be less satisfied with life in Oslo.

The rest of the section presents our data sources, construction of

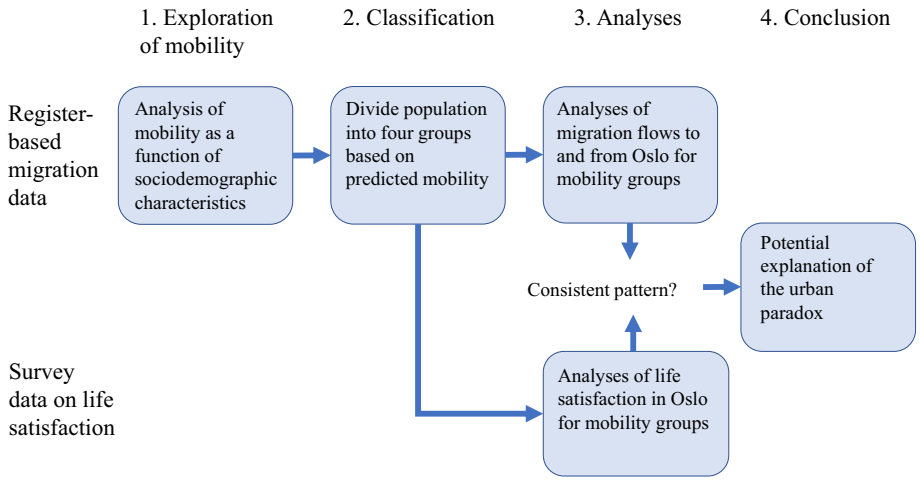

Fig. 1. Overview of the analysis.

variables and empirical specifications.

3.3. Register-based migration data

Statistics Norway has divided Norway into 90 travel-to-work areas, denoted economic regions, based on information about commuting flows between municipalities.[2] To characterize the mobility of sociodemographic groups, we investigate relocations between Norwegian regions from 2007 to 2012 and from 2002 to 2012.[3]

For all residents aged 20–89, we collected information for our six sociodemographic variables from the 2012 population and education registers of Statistics Norway.[4] In 2012, there were 3.52 million people aged 20–89 living in Norway with non-missing sociodemographic information; of these, respectively, 3.42 million lived in Norway in 2007 and 3.35 million lived in Norway in 2002.[5] For brevity, our focus will be relocations from 2007 to 2012; the results for 2002–2012 are similar.

The first column of Table 1 shows average values for the sociodemographic variables and the indicator variable for relocation. Approximately 10% changed resident region between 2007 and 2012. Just below 50% of the individuals 20–89 are married; approximately a third have children, while about 30% have higher education. 9% are born abroad.

3.4. Migration propensity analysis

The following linear probability model is estimated:

$$m_i = Age_i\beta_0 + Age_i Male_i\beta_1 + Age_i Married_i\beta_2 + Age_i Children_i\beta_3 + Age_i TertiaryEducation_i\beta_4 + Age_i Immigrant_i\beta_5 + u_i,$$

where m_i is an indicator equal to unity if person i changed resident region from 2007 to 2012, and Age_i is a vector of five-year age indicators. The indicator variables – $Male_i$, $Married_i$, $Children_i$, $TertiaryEducation_i$ and $Immigrant_i$ – are interacted with the age vector to allow for age varying effects of sociodemographic variables, and u_i is an error term assumed to have the standard properties. The mobility scores used to assign the population to mobility quartiles are the predicted values from the estimated model. As robustness analysis, we estimate a logistic regression with the same explanatory variables and use the results to compute alternative mobility scores and mobility quartiles.

Table 1
Summary statistics. Migration and survey analyses.

	Migration analysis	Survey analysis
Male	0.496	0.485
Married	0.474	0.756
Children	0.338	0.395
Tertiary education	0.309	0.449
Immigrant	0.087	0.090
Age 20–24	0.088	0.073
Age 25–29	0.078	0.065
Age 30–34	0.080	0.087
Age 35–39	0.092	0.085
Age 40–44	0.101	0.094
Age 45–49	0.097	0.095
Age 50–54	0.090	0.090
Age 55–59	0.087	0.081
Age 60–64	0.082	0.076
Age 65–69	0.072	0.088
Age 70–74	0.048	0.072
Age 75–79	0.037	0.050
Age 80–84	0.030	0.029
Age 85–89	0.019	0.016
Change of resident region, 2007–2012	0.098	
Life satisfaction		1.930
		(1.101)
N	3,422,585	36,598

The table reports means and standard deviations (parentheses) for the migration and survey datasets.

3.5. Survey data on life satisfaction

To analyze life satisfaction, we use several waves of a survey conducted by the Norwegian Government Agency for Administration and Financial Management (NGAAFM). Since 2009, the NGAAFM has administrated five separate national surveys which include the same question about life satisfaction:

"How satisfied or dissatisfied are you all in all with your life?"

Response alternatives are provided as integers on a seven-point scale from 3 to −3, where −3 is 'very dissatisfied' and 3 is 'very satisfied'.

All surveys were randomly drawn from national registers with stratification on sex, age groups and county. The surveys do not follow a panel structure, personal identifiers are not comparable across surveys and drawing the same individual in two or more surveys is possible but

[2] Oslo municipality constitutes a separate region.
[3] Migration to and from Norway is omitted from the analysis.
[4] Definitions of the sociodemographic variables are given in the Online Appendix.
[5] Population is registered January 1, 2012, while education level is registered in October 2011. Information about education level was missing for about 495,000 individuals, and family and household information was missing for about 29,000.

unlikely. The first three surveys (2009, 2012 and 2014) were postal surveys, whereas in 2017 and 2019, respondents were contacted mainly by e-mail. For the postal surveys, 30,000 questionnaires were mailed, whereas 40–45,000 respondents received e-mails in 2017 and 2019. The response rate was somewhat below 40% for the postal surveys and around 20% for the e-mail surveys.

Pooling the cross-sectional surveys produces a total of 50,851 respondents, of which 48,959 persons were in the age range 20 to 89. 47,311 of these provided answers to the question about life satisfaction. We omit 10,713 respondents that did not supply information about age, sex, marital status, children in household or education level. 23% of the remaining sample did not provide a response to the question about birth country and are assumed to be natives, leaving a total of 36,598 respondents for the analysis.[6]

The second column of Table 1 lists mean and standard deviation for life satisfaction and means for the sociodemographic variables. Comparison with the register-based sample for the Norwegian population in the first column shows that the survey sample has a somewhat larger share that is married and with higher education. Using the results of the migration propensity analysis, mobility scores are computed for each respondent from the values of his/her sociodemographic variables, and respondents are allocated to mobility quartiles based on their mobility scores.[7]

3.6. Life satisfaction analysis

We estimate three OLS regressions with life satisfaction as dependent variable. We first estimate the following model where the coefficient for living in Oslo is assumed to be the same for all mobility quartiles:

$$\begin{aligned} LifeSatisfaction_{it} =& \alpha_t + \beta_S Oslo_{it} + Age_{it}Female_{it}\beta_F + Age_{it}Male_{it}\beta_S \\ &+ \beta_M Married_{it} + \beta_C Children_{it} + \beta_T TertiaryEducation_{it} \\ &+ \beta_I Immigrant_{it} + \varepsilon_{it}, \end{aligned}$$

where $LifeSatisfaction_{it}$ is the level of satisfaction reported by respondent i in year t, α_t are year fixed effects, and $Oslo_{it}$ is an indicator of living in Oslo municipality.[8] As controls, we include $Married_{it}$, $Children_{it}$, $TertiaryEducation_{it}$, $Immigrant_{it}$ and one-year age indicators interacted with sex ($Age_{it}Female_{it}$ and $Age_{it}Male_{it}$). ε_{it} is the error term. The sociodemographic variables are included as explanatory variables to control for possible direct effects of these variables on life satisfaction.

Next, we adjust the specification, allowing the effect of residing in Oslo to vary between mobility quartiles:

$$\begin{aligned} LifeSatisfaction_{it} =& \alpha_t + Mobility_j\beta_j + Oslo_{it}Mobility_j\beta_{Oj} + Age_{it}Female_{it}\beta_F \\ &+ Age_{it}Male_{it}\beta_S + \beta_M Married_{it} + \beta_C Children_{it} \\ &+ \beta_T TertiaryEducation_{it} + \beta_I Immigrant_{it} + \varepsilon_{it}, \end{aligned}$$

where $Mobility_j$ is a vector of indicators for belonging to mobility quartile $j = \{1, 2, 3, 4\}$. β_{Oj} is a vector of parameters that gives life satisfaction in Oslo compared to the rest of the country for respondents in mobility quartile j.

Finally, we interact the Oslo dummy with socioeconomic variables instead of indicators for mobility quartiles. The purpose is to explore the reasons for any differences between mobility groups in satisfaction with life in Oslo. This part of the analysis builds on Carlsen and Leknes (2021a).

$$\begin{aligned} LifeSatisfaction_{it} =& \alpha_t + \beta_S Oslo_{it} + Oslo_{it}Sociodemographics_{itj}\beta_{Oj} \\ &+ Age_{it}Female_{it}\beta_F + Age_{it}Male_{it}\beta_S + \beta_M Married_{it} \\ &+ \beta_C Children_{it} + \beta_T TertiaryEducation_{it} + \beta_I Immigrant_{it} + \varepsilon_{it}, \end{aligned}$$

$Sociodemographics_{itj}$ is a vector of age (in years), sex, marital status, presence of children, education level and immigrant status for respondent i in year t.

4. Analysis and results

4.1. Migration propensities for sociodemographic groups

Table A.1 in the Online Appendix presents the estimated linear probability and logistic models explaining relocations between regions as a function of sociodemographic variables. The two models give very similar results. We focus on the linear model in the following.

The propensity to migrate peaks between 25 and 29 and then declines monotonically with age. The interaction between age and being male is mainly positive, suggesting that males have higher relocation probabilities. The exceptions are the two lowest age groups. Married people have lower probability to relocate, except for the two youngest age groups. Parents are less likely to relocate, but the association becomes weaker with age and turns positive for the oldest age groups. Persons with higher education have a higher likelihood of relocation, and the associations between education level and mobility are quite large. Compared to natives, immigrants have in general a higher propensity to change region.

The mobility scores (predicted relocation probabilities) vary considerably in the population. Persons with the highest mobility score are foreign-born, married females aged 20–24 without children and with tertiary education, of which 47.7% are expected to change region. The lowest mobility score have native-born married males aged 85–89 without children and without tertiary education. For this group, only 0.6% are expected to change region.

Based on the mobility scores, we allocate the population aged 20–89 in 2012 into quartiles. All persons in the fourth quartile have mobility scores above 14.6%, whereas the first quartile encompasses persons with mobility score below 2.8%.

The sociodemographic composition of the four mobility quartiles can be seen from Table 2. The most mobile group (quartile 4) is young, has a high education level and many are single. Quartiles 2 and 3 consist of middle-aged persons. Many of them have family, and the education level is average. The least mobile group consists of the oldest persons in the sample (quartile 1). In this group, the education level is low, most are married, and few have children in the household.

4.2. Migration to and from Oslo

Using information in the migration data set about resident regions in 2007 and 2012, we compute, for each mobility quartile, the number of persons who moved, respectively, to and from Oslo between 2007 and 2012. Migration rates are computed by dividing by the number of potential movers in 2007 (the population outside Oslo for in-migration; the population in Oslo for out-migration). The results are presented in panel A of Table 3; panel B shows the corresponding results for 2002–2012.[9] Both in- and out-migration rates are increasing from quartile one (the least mobile) to quartile four (the most mobile). Net migration to Oslo is positive for the fourth quartile and negative for the other quartiles.

[6] The Online Appendix compares the definitions of the socioeconomic variables in the migration and survey data sets.

[7] The number of respondents in each mobility quartile will not be identical as we allocate respondents based on the thresholds between quartiles for the whole population.

[8] The Oslo region consists only of Oslo municipality, making the territory of Oslo equal in the survey and mobility data sets.

[9] Mobility quartile affiliation is based on the results for the linear probability model. Table A.2 in the Online Appendix compares in- and out-migration by mobility quartile when the population is allocated to quartiles on the basic of the results for the logistic model. As can be seen, the results for the two models are very similar.

Table 2
Summary statistics. Mobility quartile and sociodemographics.

	Full sample	First quartile mobility	Second quartile mobility	Third quartile mobility	Fourth quartile mobility
Age	48.71	66.82	55.07	43.17	28.70
	(17.37)	(11.87)	(12.33)	(9.33)	(5.60)
Male	0.496	0.454	0.467	0.518	0.548
Married	0.474	0.835	0.571	0.295	0.179
Children	0.338	0.141	0.385	0.504	0.323
Tertiary education	0.309	0.050	0.393	0.322	0.480
Immigrant	0.087	0.001	0.069	0.154	0.125
N	3,422,585	870,156	867,945	857,840	826,644

The table displays means and standard deviations (in parentheses) for key sociodemographic variables.
The population is allocated to mobility quartiles on the basis of the results for the linear probability model.
Fourth quartile is the most mobile group, and first quartile is the least mobile group.

Table 3
Interregional migration to and from Oslo for mobility groups, 2007–2012 and 2002–2012.

Quartiles	Population in start year		Moves to Oslo		Moves from Oslo		Net migration to Oslo	
	Norway	Oslo	Number	Relative to population	Number	Relative to population	Number	Relative to population
				outside of Oslo, per cent		in Oslo, per cent		in Oslo, per cent
Panel A: Migration 2007–2012								
1	870,156	55,888	1268	0.2	2757	4.9	−1489	−2.7
2	867,945	92,156	3716	0.5	6961	7.6	−3245	−3.5
3	857,840	121,646	8751	1.2	19,123	15.7	−10,372	−8.5
4	826,644	130,331	55,217	7.9	29,162	22.4	26,055	20.0
Full sample	3,422,585	400,021	68,952	2.3	58,003	14.5	10,949	2.7
Panel B: Migration 2002–2012								
1	869,094	58,210	2452	0.3	6411	11.0	−3959	−6.8
2	861,878	97,606	6841	0.9	16,535	16.9	−9694	−9.9
3	830,742	124,190	16,664	2.4	34,918	28.1	−18,254	−14.7
4	791,964	91,477	79,023	11.3	23,699	25.9	55,324	60.5
Full sample	3,353,678	371,483	104,980	3.5	81,563	22.0	23,417	6.3

Sample: The population living in Norway both in 2012 and 2007/2002, aged 20–89 in 2012.
The population is allocated to quartiles on the basis of the results for the linear probability model.
Fourth quartile is the most mobile group, and first quartile is the least mobile group.

Table 4
Sociodemographic characteristics of population and movers, 2007–2012 and 2002–2012.

Sociodemographics	Population		Movers	
	In Oslo	Outside Oslo	To Oslo	From Oslo
Panel A: 2007–2012 sample				
Age	46.74	48.97	32.13	39.23
Male	0.488	0.497	0.496	0.499
Married	0.422	0.481	0.171	0.418
Children	0.352	0.336	0.163	0.545
Tertiary education	0.468	0.288	0.592	0.540
Immigrant	0.203	0.071	0.145	0.151
Panel B: 2002–2012 sample				
Age	48.45	48.98	34.08	43.23
Male	0.488	0.497	0.496	0.499
Married	0.441	0.476	0.217	0.472
Children	0.362	0.330	0.231	0.570
Tertiary education	0.445	0.291	0.620	0.492
Immigrant	0.175	0.056	0.122	0.127

Sample: The population living in Norway both in 2012 and 2007/2002, aged 20–89 in 2012.
The table displays means for the sociodemographic variables.

Overall net migration to Oslo is positive as the net flow of the fourth quartile is substantially bigger than the three other net flows. In both time intervals considered (2002–2012 and 2007–2012), the positive net inflow to Oslo is the sum of a large net inflow in quartile four and smaller net outflows in the other quartiles.

Table 4 shows the sociodemographic composition of people that move to and from Oslo, respectively. For the period 2007–2012, in-migrants were on average 7 years younger. A higher share had higher education (59% versus 54%). A lower share was married (17% versus 42%) and had children in the household (16% versus 55%).

4.3. Life satisfaction in Oslo

Table 5 presents the estimated effects of living in Oslo on life satisfaction. From column 1, we see that the coefficient of Oslo for the full sample is close to zero and statistically insignificant. Hence, the results indicate that people residing in Oslo are on average neither more nor less satisfied with life than respondents in the rest of the country. Other things equal, people that are native, married, with children and with tertiary education tend to have highest life satisfaction.[10]

In column 2, the effects of living in Oslo for the different mobility quartiles are displayed.[11,12] For the highest mobility quartile, the coefficient of Oslo is positive and statistically significant with a *p*-value less

[10] Table A.3 in the Online Appendix presents the results for a life satisfaction model where a set of indicators for municipal population size has been added. As can be seen, there is no association between life satisfaction and municipal population size in Norway.

[11] The effects of living in Oslo are estimated simultaneously for the four mobility groups as we have interaction terms between mobility quartile affiliation and the Oslo dummy.

[12] Respondents are allocated to mobility quartiles based on the results for the linear probability model. Table A.4 in the Online Appendix presents corresponding results when respondents are allocated to quartiles on the basic of the results for the logistic model; the results for the two models are very similar.

Table 5
Relationship between living in Oslo and reported life satisfaction for full sample and different mobility groups. OLS regressions.

	Full sample Oslo effect	Separate Oslo effect for for mobility groups
	(1)	(2)
Oslo	0.010	
	(0.017)	
Oslo × first quartile mobility		−0.016
		(0.039)
Oslo × second quartile mobility		−0.022
		(0.030)
Oslo × third quartile mobility		−0.069
		(0.042)
Oslo × fourth quartile mobility		0.098***
		(0.029)
Married	0.373***	0.347***
	(0.016)	(0.018)
Children	0.063***	0.050***
	(0.017)	(0.018)
Tertiary education	0.186***	0.215***
	(0.012)	(0.016)
Immigrant	−0.135***	−0.108***
	(0.022)	(0.023)
N	36,598	36,598
Adjusted R-squared	0.050	0.051

Both regressions include fixed effects for year and age-sex combinations.
In column (2), mobility group controls are added.
The population is allocated to mobility quartiles on the basis of the results for the linear probabilty model.
Fourth quartile is the most mobile group, and first quartile is the least mobile group.
Robust standard errors are in parentheses.
*** p < 0.01, ** $p < 0.05$, * $p < 0.1$.

than 0.01. The coefficient is sizable and approximately 10% of the standard deviation of the life satisfaction variable. Comparison with coefficients of the sociodemographic variables shows that the effect of living in Oslo on life satisfaction for the highest mobility quartile is approximately half the effect of having tertiary education and about one fourth of the effect of being married.

Table 6
Relationship between living in Oslo and reported life satisfaction for different sociodemographic groups. OLS regressions.

	(1)	(2)
Oslo	0.105*	0.041
	(0.054)	(0.044)
Oslo × age	−0.003***	−0.003***
	(0.001)	(0.001)
Oslo × male	−0.043	
	(0.035)	
Oslo × married	−0.032	
	(0.041)	
Oslo ×children	0.030	
	(0.037)	
Oslo × tertiary education	0.082**	0.075**
	(0.038)	(0.037)
Oslo × immigrant	−0.048	
	(0.050)	
Married	0.377***	0.372***
	(0.017)	(0.016)
Children	0.073***	0.067***
	(0.018)	(0.017)
Tertiary education	0.176***	0.177***
	(0.012)	(0.012)
Immigrant	−0.123***	−0.134***
	(0.025)	(0.022)
N	36,598	36,598
Adjusted R-squared	0.051	0.051

Both regressions include fixed effects for year and age-sex combinations.
Robust standard errors are in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

For the three other mobility quartiles, the coefficient for Oslo is negative but not statistically significant. F-tests show that the coefficient for Oslo for the highest mobility quartile is statistically different from the coefficients of the other mobility quartiles, indicating that the respondents in the highest mobility quartile report statistically higher life satisfaction in Oslo relative to the rest of the country compared to respondents in the other three groups.

In the first column of Table 6, we have interacted the Oslo dummy with the six sociodemographic variables instead of with the dummy variables for mobility quartile affiliation. In the second column, only statistically significant interaction terms are included. We see that life satisfaction in Oslo relative to elsewhere is affected by age and education level. Young persons with tertiary education have on average high levels of life satisfaction in Oslo, whereas elderly people without tertiary education tend to be relatively more satisfied with life in the rest of the country.

5. Discussion

The analysis of migration between Norway regions identifies three distinct sociodemographic groups with respect to mobility. The most mobile group (quartile four) consists of young, usually single, and relatively well-educated persons. The second and largest group (quartiles two and three) mainly consists of middle-aged persons, of which many are married and have children. Older people account for the third and least mobile group (quartile one).

Our analyses of life satisfaction and migration flows produce similar conclusions for the second and third groups, whereas the most mobile group displays a distinct empirical pattern. There is positive net migration to Oslo only in the most mobile group. In the two other groups, more people move from Oslo than to Oslo. Gross and net migration flows are substantially higher in the most mobile group, and since this group dominates migration flows, overall net migration to Oslo becomes positive. Migration thus contributes to the population growth of the capital.

The most mobile group is also the only that reports higher life satisfaction in Oslo than in the rest of the country. For the other groups, residents in Oslo report lower life satisfaction, although the estimates are low in absolute value and not statistically significant. When we allow the effect of living in the capital on life satisfaction to depend on our sociodemographic variables, we find that young persons with tertiary education report particularly high levels of satisfaction in Oslo, suggesting that the positive effect of belonging to the most mobile quartile on life satisfaction in Oslo mainly works through age and education level.

The distinct results for the most mobile group show that the population can be divided into two categories: 1) a minority (quartile 4) that is mobile, reports higher life satisfaction in Oslo than in the rest of the country, and displays positive net migration to the capital, and 2) a majority (quartiles 1–3) that is less mobile, reports lower life satisfaction in Oslo, and displays net migration out of the capital. The mobile minority dominates migration flows and contributes to population growth in Oslo, whereas the less mobile majority depresses average reported life satisfaction in the capital compared to the rest of the country.

These results shed light on the paradox of the growing, unhappy city. If migration flows are dominated by a mobile minority whereas average happiness/life satisfaction is determined by a less mobile majority, there may be no apparent logical relationship between net migration and average happiness/life satisfaction at the city level. A city can grow despite low scores on happiness/life satisfaction, and this phenomenon can be explained without assuming that people move to places that make them unhappy.

Compared to the out-migrants, in-migrants possess characteristics that are positively correlated with both appraisal of big city living and mobility. These differences between in- and out-migrants suggest a certain urban/non-urban population dynamic. Young, single persons

relocate to cities to study, make a career and enjoy the qualities of city life. As they become older, establish family and have children, preferences are altered. Preferences for space, safety and access to nature become stronger. In this life phase, mobility is lower, social networks have been formed, and many decide to stay put. The stayers in cities are on average less satisfied than young in-migrants and comparable individuals in smaller towns and the countryside, but they consider the disadvantages of relocation to be greater than the advantages. Consequently, net migration continues to remain positive although average satisfaction in the city is lower or no different from the rest of the country.

6. Concluding remarks

Our results support the hypothesis of Philip S Morrison and co-authors that low average subjective well-being in large cities is due to heterogeneity of the city population. The combination of heterogeneity in appraisal of big city life and heterogeneity in mobility can also explain why such cities continue to grow. A minority of highly mobile citizens evaluate big city life positively and are drawn to large cities. A majority of less mobile citizens are less satisfied and tend to move out of these cities, but this flow is too small to halt city growth. Heterogeneity can thus explain the paradox of 'growing, unhappy cities' without assuming that people are moving to places where they are unhappy. Comparing the largest city, Oslo, to the rest of the country, we show that our hypothesis is consistent with the data for Norway. Although average life satisfaction in Oslo is not higher than the county average, net migration is positive due to inflow of people in the most mobile quartile.

Cities share common features that follow from high density of people, but the mix of positive and negative city attributes will vary between cities. There will also be variation across cities in the composition of in- and out-migration flows. For instance, cities with a large manufacturing sector may experience in-migration predominantly of persons without higher education. The mix of city attributes and the size and composition of migration flows combine to produce trajectories of average life satisfaction that can vary between and within countries. In future work, we plan to use multi-country surveys and data of interregional migration to extend our investigation to other countries to examine whether our results for Oslo can be generalized to other cities.

Our results are likely to be more relevant for developed countries than for developing countries. Two extensive cross-country studies of the urban-rural gap in subjective well-being, Glaeser et al. (2016), using data from the Word Values Survey, and Easterlin et al. (2011), using data from Gallup World Poll, both find that the urban-rural gap tends to be positive in developing countries and close to zero in developed countries. Although large cities in developing countries face many of the same challenges as large cities in richer countries – pollution, crime, noise and congestion – these negative factors do not seem to outweigh the positive traits, like higher income and better job opportunities. It is thus less likely that large cities in developing country will display the characteristics of 'growing, unhappy cities'.

Another interesting extension of our work would be to examine intra-city heterogeneity in subjective well-being. Since subjective well-being in large cities depends on sociodemographic factors, selection of migrants into neighborhoods according to personal characteristics, like age, education, income and family status, is likely to create spatial variation in average happiness/life satisfaction. Intra-city heterogeneity will also depend on the residence pattern of low-mobility groups that decide to remain in the city.

A third extension would be to use survey data about perceived quality of consumer amenities – variety of goods, services and cultural amenities, education and job opportunities, housing standards, safety, pollution, etc. – to examine how these amenities affect subjective well-being for different sociodemographic groups. Information about inequalities in subjective well-being between sociodemographic groups, and about the importance of city amenities for the subjective well-being of each group, is a potentially valuable input for city policy makers aiming to raise average subjective well-being and improve living conditions for groups that display low happiness/life-satisfaction.

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Data availability statement

The survey and register data are available under license from the Norwegian Government Agency for Administration and Financial Management and Statistics Norway, respectively. Contact the authors for access to Stata codes on model specifications.

CRediT authorship contribution statement

Fredrik Carlsen: Conceptualization, Methodology, Formal analysis, Investigation, Writing – original draft, Writing – review & editing. **Stefan Leknes:** Methodology, Formal analysis, Investigation, Writing – review & editing, Visualization.

Declaration of competing interest

The authors declare that there is no conflict of interest.

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Appendix A. Supplementary data

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